

### **Remarks**

The final Office action issued November 23, 2009, has been reviewed and carefully considered.

By this amendment, claim 18 has been amended, and claims 60 and 61 have been added. Claims 1-17, 22, 23 and 27-53 were previously cancelled, and claims 24-26 and 54-59 were previously withdrawn. Thus claims 18-21, 24-26 and 54-61 will be pending after entry of this amendment. Applicants respectfully request reconsideration and withdrawal of all outstanding claim rejections, as well as rejoinder of claims 24-26 and 54-59, in view of the amendments above and the remarks that follow.

### **Claims 18 and 19**

Claims 18 and 19 stand rejected under 35 U.S.C. §§ 102(e) and 103(a) as allegedly being unpatentable over U.S. Patent Publication No. 2003/0105172 (Bowe).

Respectfully, one of ordinary skill in the art would not confuse the narrow tubes 68 shown in FIG. 6 of the Bowe reference (which carry reformat stock and are coated with a catalyst, Bowe, ¶ [0047]) for the “heating channel” structures claimed in claim 18. As the instant specification makes clear, such “heating channel” structures are structures configured to convey a heating fluid (and not reformat) that transfers heat to a reformat stream passing through “reforming channel” structures and undergoing an endothermic, hydrocarbon reforming reaction. See, e.g., Specification, page 3, lines 13-15. As the specification further points out, “reforming channel” structures can comprises a catalyst for catalyzing such an endothermic reaction. Accordingly, allegations the catalyst-coated tubes 68 shown in FIG. 6 somehow define “heating channel inlets” (or outlets) as claimed are inapposite.

Nonetheless, independent claim 18 has been amended to expedite issuance and/or to save on prosecution costs. More specifically, independent claim 18 now recites, *inter alia*, that “the steam reformer is a panel defining a first face comprising one or more heating channel inlets and a second face comprising one or more heating channel outlets and a corresponding one or more heating channels extending therebetween, wherein the panel further comprises a plurality of reforming channels configured to reform steam and comprising a catalyst therefor, and wherein each of the one or more heating channels is configured to transfer heat from a fluid passing

through therethrough to a fluid passing through the reforming channels, wherein the length and width of each face is substantially greater than the distance between the faces, such that each of the one or more heating channels is substantially shorter in length than each of the reforming channels.” (Emphasis indicates amendment.)

As noted above, the specification clearly distinguishes between “reforming channel” structures (configured to convey a reformat stream in which a hydrocarbon reforming reaction occurs) and “heating channel” structures (which have a relatively shorter length than a reforming channel structure and convey a heating fluid, such as, for example, a combustion exhaust). Claimed systems comprising a steam reformer as recited in amended claim 18 provide rapid start-up times and can allow a temperature of an incoming heating fluid stream to substantially exceed a maximum service temperature of the reformer, unlike the reactors 40, 60 disclosed in the Bowe reference.

Such reactors 40, 60 would not enjoy the performance advantages provided by reformers as claimed in claim 18, at least because flow paths defined by the corrugated foils 64 of Bowe are substantially longer than a flow path of the narrow tubes 68. The Bowe reference does not appreciate these and other deficiencies of the reactors 40, 60, let alone the advantages provided by systems claimed in claim 18. In addition, one of ordinary skill in the art would not have recognized the noted deficiencies of the Bowe reference, or the advantages provided by systems claimed in claim 18. Accordingly, even after reviewing the Bowe reference, one of ordinary skill in the art would have had no reason to provide a steam reformer having heating channels being comparatively shorter than reforming channels, as claimed in claim 18.

Claim 18 is patentable over the Bowe reference.

Claim 19 must be patentable over Bowe for at least the same reasons as claim 18 by virtue of its dependency from claim 18, as well as for the additional features claim 19 recites. For example, claim 19 recites that “the smallest open dimension of each heating channel is less than about 0.05 inch.” Nothing in the Bowe reference would have lead one of ordinary skill in the art to provide such a small open dimension. For example, the smallest open dimension disclosed by the Bowe reference is about 40% larger.

### **Claims 20 and 21**

Claims 20 and 21 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Bowe and U.S. Patent Publication No. 2001/0049906 (Shimazu).

Claims 20 and 21 depend from and incorporate the features of independent claim 18. As set forth above, independent claim 18 is patentable over Bowe. Shimazu does not overcome the deficiencies of Bowe with regard to at least claim 18. Accordingly, claim 18 must be patentable over Bowe and Shimazu. Thus, claims 20 and 21 must also be patentable over Bowe and Shimazu for at least the same reasons as independent claim 18, as well as for the additional features these claims recite.

For example, the blower disclosed in the Shimazu reference does not convey “hot gas through the reformer and vaporizer heating channels at different flow rates during system start up and system operation,” as claimed in claim 21. Instead, Shimazu’s blower 26 (shown in FIG. 1) merely mixes reformat stock (Shimazu, ¶ [0053]).

### **Claims 24-26 and 54-59**

Claims 24-26 and 54-59 depend either directly or indirectly from independent claim 18. As set forth above, claim 18 is in condition for allowance. Accordingly, claims 24-26 and 54-59 must be patentable for at least the same reasons as independent claim 18 as well as for the additional features these claims recite. Claims 24-26 and 54-59 should be rejoined.

### **New Claims 60 and 61**

New claims 60 and 61 depend either directly or indirectly from independent claim 18. As set forth above, claim 18 is in condition for allowance. Accordingly, claims 60 and 61 must be patentable for at least the same reasons as independent claim 18, as well as for the additional features these new claims recite.

### **CONCLUSION**

Although additional arguments concerning the patentability of the claims could have been made, all outstanding rejections have been overcome. Therefore, claims 18-21, 24-26 and 54-61 are in condition for allowance, and such action is earnestly solicited. Please contact the


undersigned by telephone if such contact would further the examination of the present application.

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